

WHAT IS CLAIMED IS:

(72)

1. A cross member for a motor vehicle, comprising:
an elongated, center structure having a first end, a mid portion, and a second end, said center structure being formed as a non-cast structure;
a first casting rigidly connected to said first end of said center structure; and
a second casting rigidly connected to said second end of said center structure,
each of said first and second castings being configured and arranged to be attached to a respective motor vehicle element,
each of said first and second ends of said center structure including a flange extending from said center structure and constructed and arranged to rigidify and strengthen said center structure while providing a surface that can be placed against a side surface of a respective casting of said first and second castings for attachment with said respective casting of said first and second castings.
2. A cross member according to claim 1, wherein said center structure is constructed as a one-piece, unitary structure.
3. A cross member according to claim 2, wherein said metallic material is selected with a group consisting of steel and aluminum.
4. A cross member according to claim 1, wherein said center structure has a U-shaped cross section.
5. A cross member according to claim 1, wherein each of said castings includes a flange and wherein each of said castings is rigidly connected to said center structure by rigidly connecting said flange of each casting to said center structure.
6. A cross member according to claim 1, wherein each of said castings is rigidly connected to said center structure using fasteners.
7. A cross member according to claim 6, wherein said fasteners are rivets.
8. A cross member according to claim 7, wherein each casting is rigidly connected to said center structure using an adhesive.
9. A cross member according to claim 1, wherein each casting is rigidly connected to said center structure by welding.
10. A cross member according to claim 4, further comprising a cover mounted beneath and rigidly secured to said center structure to close the U-shaped cross-section of said center structure.
11. A frame for a motor vehicle, comprising:

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first and second side frame members; and
a cross member coupled to and extending between said first and second side frame members, said cross member having
an elongated, center structure having a first end, a mid portion, and a second end, said center structure being formed as a one-piece, unitary, non-cast structure,
a first casting rigidly connected to said first end of said center structure, and
a second casting rigidly connected to said second end of said center structure,
said first and second castings being attached to said first and second side frame members, respectively, and
each of said first and second ends of said center structure including a flange extending from said center structure and constructed and arranged to rigidify and strengthen said center structure while providing a surface that can be placed against a side surface of a respective casting of said first and second castings for attachment with said respective casting of said first and second castings.

12. A frame according to claim 11, wherein said center structure is a one-piece, unitary structure.

13. A frame according to claim 12, wherein said center structure has a U-shaped cross section and further comprises a cover mounted beneath and rigidly secured to said center structure and to each of said castings.

14. A method of forming a cross member for a motor vehicle, comprising:
forming an elongated, center structure by a method other than casting such that the center structure has a first end, a mid portion, and a second end;

forming first and second cast structures by casting, each cast structure being configured and arranged to be attached to respective motor vehicle elements; and

connecting the first and second cast structures to the first and second ends, respectively, of the center structure to form a rigid connection between the center structure and the first and second cast structures;

wherein each of the first and second ends of the center structure are formed to include a flange extending from the center structure and constructed and arranged to rigidify and strengthen the center structure while providing a surface that is placed against a side surface of a respective casting of the first and second castings for the connection with the respective casting of the first and second castings.

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15. A method according to claim 14, wherein the center structure is formed by stamping.

16. A method according to claim 14, wherein the connecting of the first and second cast structures to the center structure includes attaching respective flanges of the first and second cast structures to the center structure.

17. A method according to claim 16, wherein the connecting is carried out by welding.

18. A method according to claim 16, wherein the connecting is carried out by attaching fasteners between each of the cast structures and the center structure.

19. A method according to claim 14, wherein the center structure is formed as a one-piece, unitary structure.

20. A method of forming a motor vehicle frame, comprising:
forming an elongated, center structure by a method other than casting such that the center structure has a first end, a mid portion, and a second end;

forming first and second cast structures by casting, each cast structure being configured and arranged to be attached to respective motor vehicle elements;

connecting the first and second cast structures to the first and second ends, respectively, of the center structure to form a rigid connection between the center structure and the first and second cast structures, wherein each of the first and second ends of the center structure are formed to include a flange extending from the center structure and constructed and arranged to rigidify and strengthen the center structure while providing a surface that is placed against a side surface of a respective casting of the first and second castings for the connection with the respective casting of the first and second castings; and

connecting the first cast structure to a first motor vehicle frame member; and

connecting the second cast structure to a second motor vehicle frame member.

21. A cross member according to claim 1, wherein

each said flange of said first and second ends of said center structure form part of a single, continuous flange that extends along the entire perimeter of said center structure.

22. A cross member according to claim 1, wherein

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each said flange of said first and second ends of said center structure extends transversely relative to said elongated center structure.

23. A frame according to claim 11, wherein

each said flange of said first and second ends of said center structure form part of a single, continuous flange that extends along the entire perimeter of said center structure.

24. A frame according to claim 11, wherein

each said flange of said first and second ends of said center structure extends transversely relative to said elongated center structure.

25. A method according to claim 14, wherein

connecting each of the first and second cast structures to the first and second ends includes moving one of the first cast structure and the first end in a fore-aft/up-down slip plane prior to forming a rigid connection to assure dimensional accuracy.

26. A method according to claim 20, wherein

connecting each of the first and second cast structures to the first and second ends includes moving one of the first cast structure and the first end in a fore-aft/up-down slip plane prior to forming a rigid connection to assure dimensional accuracy.

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